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DEVELOPMENT AND MANAGEMENT
OF
COMMERCIAL FISHING PRACTICES IN FORT PECK RESERVOIR

Segment 4 Report
October 1, 1984 - September 30, 1985

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INTRODUCTION

The purpose of this study is to gather and evaluate information on the relative abundance, distribution, and reproductive success of commercial, forage, and sport fish populations in Fort Peck Reservoir.

The specific objectives for this segment were:

- (1) Monitor harvest and movement of commercial and sport fish within the reservoir.
- (2) Determine distribution and relative abundance of various fish species and obtain baseline information on zooplankton populations and physical limnology.
- (3) Determine principal spawning areas and spawning success of commercial and sport fish species and evaluate impacts of water level fluctuations.
- (4) Evaluate success of recent introductions of spottail shiner (Notropis hudsonius) and cisco (Coregonus artedii).

A map of the study area is shown in Figure 1, with general study areas listed.

METHODS

Frame traps, 4- x 6-foot with 1-inch square mesh, were used to sample fish in spring. Leads 50 feet long with 1- or 1 1/2-inch square mesh sizes were attached to shore. Traps were usually checked every two to three days, depending on number of fish captured. Fish were fin-clipped to indicate previous capture. Selected species of fish were sexed, weighed, and measured; all species were identified and counted.

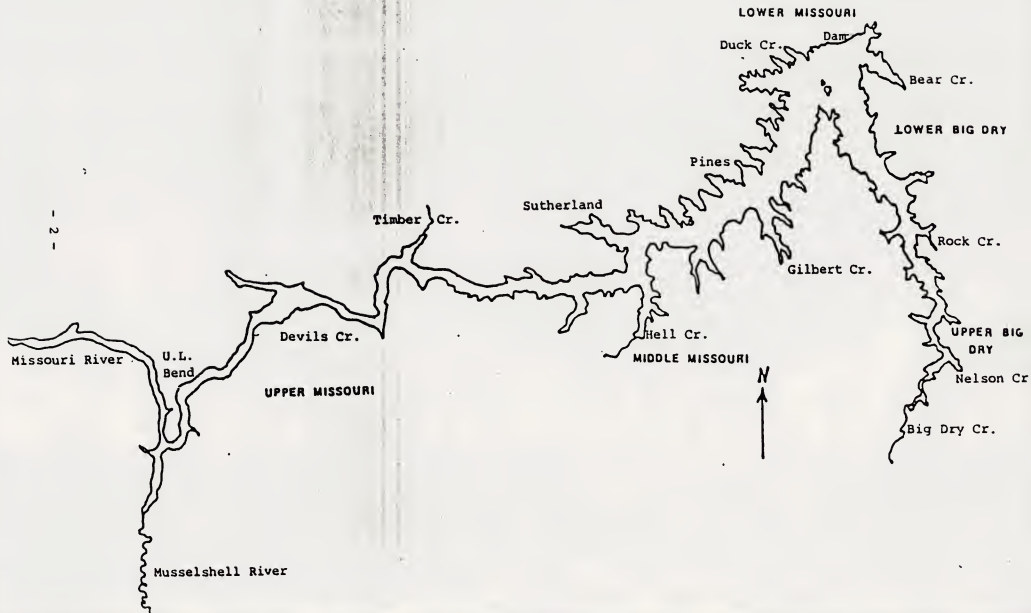
Experimental gill nets, 125- x 6-feet, were used to monitor fish distribution and composition in late summer and early fall. Each net contained five panels, 25 feet in length, with 3/4-, 1-, 1 1/4-, 1 1/2-, and 2-inch square mesh sizes.

Spawning success of various fish species was determined by sampling in late summer/early fall with 100- x 10-foot beach seines with 1/4- and 3/16-inch square mesh sizes.

Temperature profiles were taken from the surface to the lake bottom at 5-foot intervals. Samples were taken at eight stations throughout the reservoir from May through October. Temperatures were measured to the nearest 0.5°C with a Yellow Springs Model 54 electric thermometer. An 8-inch diameter Secchi disc was used to determine water transparency from the surface down to the nearest 0.5 feet.



Figure 1. Map of Fort Peck Reservoir depicting principal fish sampling areas, 1985.





Zooplankton were sampled with a standard nylon plankton net with a 12-inch diameter mouth. Detailed sampling methods are provided in Segment 1 and 2 Report (Wiedenheft, 1983).

TRAPPING

Spring spawning adult fish were sampled in the Big Dry Arm and lower Missouri Arm using frame traps.

In the upper Big Dry Arm, traps were fished a total of 97 trap-days, from April 8 through April 26, 1985. A total of 2,888 fish were captured, averaging 29.8 fish per trap-day (Table 1). The average lengths, weights, and ranges of these fish is given in Table 2.

As in previous years, walleye were the most abundant fish species trapped in the upper Big Dry. The total number of walleye taken was 1,202, or 12.4 fish per trap-day. This was more than double the number captured in 1984 (Appendix Table 1). Male walleye comprised 83 percent of the total number taken, and females 15 percent. The remaining 2 percent were walleye of undetermined sex.

Northern pike were the second most abundant game fish. The total number captured was 69, or an average of 0.8 fish per trap-day. This was a slight increase in numbers taken per trap-day in 1984. Male northernns made up 45 percent of the total sampled, and females 3 percent. Those of undetermined sex comprised 52 percent.

Sauger were less abundant than in 1984, with only 13 captured, or 0.1 fish per trap-day.

Yellow perch numbers doubled last year's catch, from 2.5 fish to 5.0 fish per trap-day.

Other sport fish taken were: 10 burbot, 61 channel catfish, and 17 black bullhead.

River carpsucker were the most dominant rough fish, numbering 360. Other rough fish species included: 262 shorthead redhorse sucker, 141 white sucker, 141 carp, 74 goldeye, 47 smallmouth buffalo, 3 bigmouth buffalo, and 1 freshwater drum.

In the mid-Big Dry Arm, traps were run for 6 trap-days, from April 26 through April 29. The average number of fish captured per trap-day was 52.8. The most abundant game fish was northern pike, averaging 9.5 fish per trap-day. The average weight of northernns was 4.9 pounds. Walleye were second in abundance, with 3.8 fish sampled per trap-day; average weight was 1.6 pounds. As in 1984, yellow perch were the most dominant nongame fish. The average number taken per trap-day was 26.8, which was significantly higher than in 1984 when only 6.3 were captured per trap-day. Smallmouth buffalo were the second most numerous nongame fish, averaging 4.8 fish per trap-day. Table 1 lists other species trapped in this area.



Table 1. Number and species of fish trapped at various locations on Fort Peck Reservoir, 1985.

Species	Upper		Mid		Lower		Lower	
	Big Dry Arm ¹		Big Dry Arm ²		Big Dry Arm ³		Missouri Arm ⁴	
	No.	No./	No.	No./	No.	No./	No.	No./
	Fish	Trap-day	Fish	Trap-day	Fish	Trap-day	Fish	Trap-day
Walleye	1,202	12.4	23	3.8	34	2.4	43	0.8
Northern pike	69	0.8	57	9.5	39	2.8	36	0.7
Sauger	13	0.1	---	---	---	---	31	0.6
Yellow perch	487	5.0	161	26.8	300	21.4	7	0.1
Burbot	10	0.1	1	0.2	5	0.4	3	<0.1
Goldeye	74	0.8	2	0.3	---	---	33	0.6
White sucker	141	1.5	4	0.7	11	0.8	55	1.1
River carpsucker	360	3.7	6	1.0	1	<0.1	1	<0.1
Smallmouth buffalo	47	0.5	29	4.8	4	0.3	---	---
Carp	141	1.5	28	4.7	53	3.8	67	1.3
Shorthead redhorse sucker	262	2.7	5	0.8	8	0.6	10	0.2
Channel catfish	61	0.6	---	---	7	0.5	3	<0.1
Freshwater drum	1	<0.1	---	---	---	---	---	---
Black crappie	---	---	---	---	---	---	2	<0.1
Bigmouth buffalo	3	<0.1	---	---	---	---	2	<0.1
Smallmouth bass	---	---	---	---	---	---	1	<0.1
Black bullhead	17	0.2	1	0.7	---	---	---	---
Cisco	---	---	---	---	---	---	2	<0.1
Totals	2,888	29.8	317	52.8	462	33.0	296	5.7
Total No. Trap-days	97		6		14		52	

¹Upper Big Dry Arm
Big Dry Cr.
Nelson Cr.

²Mid Big Dry Arm
McGuire Cr.
Lone Tree Cr.

³Lower Big Dry Arm
Bug Cr.
Box Cr.
N. & S. Forks Rock Cr.
Sandy Arroyo
Box Elder Cr.
Spring Cr.

⁴Lower Missouri Arm
Duck Cr.
Marina
Milk Coulee
Bear Cr.



Table 2. Average lengths, weights, and ranges for various fish species captured in frame traps in the Upper Big Dry in 1985.

Species	No.	Ave. Total Length (inches)	Ave. Total Weight (pounds)
Walleye (M)	606	15.34 (11.5-25.4)	1.31 (00.60-04.75)
Walleye (F)	111	18.05 (08.4-27.5)	2.54 (00.72-07.50)
Walleye (Unk)	18	18.07 (11.5-28.0)	2.11 (00.45-06.60)
Sauger (M)	6	14.93 (13.3-17.6)	1.07 (00.80-01.76)
Sauger (F)	2	19.15 (18.2-20.1)	2.44 (02.15-02.72)
Sauger (Unk)	3	15.53 (11.5-19.7)	1.31 (00.85-02.08)
Northern pike (M)	31	25.48 (20.0-31.0)	4.13 (02.68-07.30)
Northern pike (F)	2	29.65 (26.4-32.9)	6.85 (04.30-09.40)
Northern pike (Unk)	36	26.63 (21.3-31.5)	4.97 (02.20-07.90)
Yellow perch	169	8.03 (05.5-10.8)	0.26 (00.09-00.64)
River carpsucker	115	19.01 (14.4-24.7)	3.79 (01.50-07.80)
White sucker	97	13.06 (08.5-18.0)	1.10 (00.27-02.42)
Smallmouth buffalo	37	23.02 (17.5-30.4)	6.63 (03.10-17.40)
Bigmouth buffalo	3	28.01 (27.4-28.5)	11.25 (11.00-11.50)
Carp	91	19.03 (15.7-28.1)	3.05 (01.48-08.25)
Channel catfish	52	17.02 (06.0-32.0)	1.93 (00.18-12.09)
Burbot	8	19.04 (11.6-27.3)	2.48 (01.20-06.05)
Shorthead redhorse sucker	122	16.03 (08.5-19.2)	1.63 (00.20-02.65)



Trapping in the lower Big Dry Arm was carried out from April 29 through May 24, for a total of 14 trap-days. A total of 462 fish were captured at a rate of 33.0 per trap-day. Northern pike were the most dominant sport fish, with catches averaging 2.8 per trap-day; the average weight was 3.8 pounds. Walleye averaged 2.4 fish per trap-day with an average weight of 1.1 pounds. Yellow perch were the most abundant nongame species, with 21.4 fish captured per trap-day. Carp were taken at a rate of 3.8 per trap-day. Other species captured are listed in Table 1.

In the lower Missouri Arm, trapping occurred from May 6 through 20, for a total of 52 trap-days. The average number of fish taken per trap-day was 5.7. Walleye were the most dominant game fish species, averaging 0.8 fish per day. The average weight of walleye was 0.9 pounds. Northern pike averaged 0.7 per trap-day with an average weight of 6.0 pounds. The most dominant nongame fish was carp, with 1.3 fish taken per trap-day. White suckers were second, averaging 1.1 fish per trap-day.

No spring trapping was done in the middle and upper Missouri Arm during 1985.

GILL NETTING

Gill nets were set at various locations throughout the reservoir from July 23 through August 23. Netting results are shown in Table 3.

In the upper Big Dry Arm, the most abundant fish was adult goldeye. They made up 48 percent of the total number of fish captured. Walleye were the second most abundant fish, making up 20 percent of the total catch. Walleye numbers were up slightly from 1984, where they comprised 17 percent of the total. The number taken per net-day was also up from the previous year, 6.6 to 10.2. Yellow perch made up 17 percent of the total catch.

The catch in the lower Big Dry was dominated by walleye, which made up 24 percent of the total. This was double the number sampled in 1984. Goldeye were second in abundance, with 23 percent of the total catch. Yellow perch comprised 19 percent of the total.

As in past years, goldeye were the most abundant fish captured in the lower Missouri Arm, comprising 52 percent of the catch. Walleye made up 22 percent, which was three times the number sampled in 1984.

Goldeye were the most dominant fish in the middle Missouri Arm, as in past years. They contributed 30 percent to the total number of fish captured. Sauger made up 25 percent, and walleye 17 percent. The catch rate for sauger and walleye increased significantly from 1984, with 1985 rates at 7.5 sauger and 4.9 for walleye, compared to 3.4 and 2.9 in 1984.

In the upper Missouri Arm, gill-netting samples were dominated by goldeye, comprising 51 percent of the catch. This was nearly the same as 1984 when 53 percent of the fish netted were goldeye. Sauger made up 19 percent of



Table 3. Various fish species captured by 125-foot gill net in Fort Peck Reservoir during 1985.

Species ¹	Upper Big Dry ²		Lower Big Dry ³		Lower Missouri ⁴		Mid Missouri ⁵		Upper Missouri ⁶		Total	
	No. Fish	No. per Net Day	No. Fish	No. per Net Day	No. Fish	No. per Net Day	No. Fish	No. per Net Day	No. Fish	No. per Net Day	No. Fish	No. per Net Day
WE	122	10.2	97	5.4	65	3.6	102	4.9	31	1.7	417	4.8
NP	8	0.7	15	0.8	5	0.3	6	0.3	2	0.1	36	0.4
SG	---	---	45	2.5	20	1.1	157	7.5	227	12.6	449	5.2
YP	102	8.5	74	4.1	7	0.4	90	4.3	189	10.5	462	5.3
GE	294	24.5	92	5.1	150	8.3	181	8.6	617	34.3	1,334	15.3
WS	8	0.7	7	0.4	13	0.7	1	<0.1	---	---	29	0.3
RC	7	0.6	15	0.9	---	---	5	0.2	54	3.0	81	0.9
SB	2	0.2	5	0.3	---	---	---	---	1	<0.1	8	0.1
C	6	0.5	5	0.3	7	0.4	11	0.5	19	1.1	48	0.6
RS	7	0.6	17	0.9	11	0.6	20	0.9	29	1.6	84	1.0
CC	55	4.6	16	0.9	10	0.6	17	0.8	17	0.9	115	1.3
FD	---	---	---	---	---	---	4	0.2	15	0.8	19	0.2
SM	---	---	---	---	---	---	2	0.1	---	---	2	<0.1
ST	1	1.0	---	---	---	---	---	---	---	---	1	<0.1
SS	---	---	4	0.2	2	0.1	2	0.1	2	0.1	10	0.1
CI	---	---	1	<0.1	1	<0.1	---	---	---	---	2	<0.1
SP	---	---	2	0.1	1	<0.1	2	0.1	---	---	5	<0.1
CO	---	---	1	<0.1	---	---	---	---	---	---	1	<0.1
CH	---	---	---	---	1	<0.1	---	---	3	0.2	4	<0.1
Totals	612	51.0	396	22.0	293	16.3	600	28.6	1,206	67.0	3,107	35.7
No. Net Days	12		18		18		21		18		87	

¹WE - walleye

WS - white sucker

CC - channel catfish

CI - cisco

NP - northern pike

RC - river carpsucker

FD - freshwater drum

SP - silvery/plains minnow

SG - sauger

SB - smallmouth buffalo

SM - smallmouth bass

CO - coho salmon

YP - yellow perch

C - carp

ST - spottail shiner

CH - chinook salmon

GE - goldeye

RS - shorthead redhorse sucker

SS - shovelnose sturgeon

²Upper Big Dry: Nelson Cr., Lone Tree, McGuire Cr., Short Cr.³Lower Big Dry: Box Cr., N./S. Fork Rock Cr., Box Elder Cr., Sandy Arroyo Cr., Spring Cr.⁴Lower Missouri: Bear Cr., N./S. Fork Duck Cr., Marina Area, Milk Coulee Bay, Main Duck Cr.⁵Mid Missouri: Pines, Gilbert Cr., Cattle Cr., Crooked Cr., Hell Cr., Snow Cr., Sutherland Cr.⁶Upper Missouri: Crooked Cr., Musselshell Bay, Fourchette, Seven Blackfoot, Timber Cr., Ghost Cr.



the total and yellow perch comprised 16 percent. Catch rates for both these species were up significantly from 1984. Walleye numbers were also up from the previous year, but comprised only 3 percent of the total catch.

BEACH SEINING

A large number of bays were seined throughout the reservoir to sample Age 0 fish and forage minnows. Results of seining are shown in Table 4.

A total of 22,903 fish were captured in 18 seine hauls in the upper Big Dry Arm. The most common fish species sampled was yellow perch young-of-year (YOY), which comprised 83 percent of the catch. Other common species included: emerald shiners, 13 percent; spottail shiners, 2 percent; and freshwater drum, 1 percent.

Seining in the lower Big Dry Arm captured 7,481 fish in 42 seine hauls. The dominant species was yellow perch (YOY), which comprised 95 percent of the total catch. Emerald shiners made up 4 percent of the total.

In the lower Missouri Arm, 57 seine hauls produced 2,003 fish. The most abundant fish sampled was yellow perch (YOY), which comprised 36 percent of the total catch. Other prevalent species captured were: white suckers (YOY), 22 percent; spottail shiners, 18 percent; emerald shiners, 15 percent; crappie sp. (YOY), 6 percent; walleye (YOY), 1 percent; and carp (YOY), 1 percent.

A total of 11,682 fish were captured in 44 seine hauls in the mid-Missouri Arm. Yellow perch (YOY) were the dominant species, making up 35 percent of the catch. Spottail shiners comprised 29 percent, and emerald shiners 15 percent. YOY crappie species made up 12 percent.

In the upper Missouri Arm, 36 seine hauls produced 11,825 fish. Emerald shiners were the most abundant species, with 73 percent of the total catch. Yellow perch (YOY) comprised only 6 percent of the total. Goldeye (YOY) made up 4 percent; freshwater drum (YOY), 4 percent; western silvery/plains minnows, 3 percent; and crappie (YOY), 3 percent. Buffalo sp. contributed nearly 2 percent to the total catch.

Beach seining throughout the reservoir indicated that little natural reproduction of northern pike occurred during 1985. No northerns were stocked as fry or fingerlings. Walleye (YOY) survival appeared to improve over the previous year, as numbers of fingerlings seined were nearly double the number taken per seine haul in 1984. The number of smallmouth bass (YOY) was down from the previous year's catch; no fry or fingerlings were stocked in 1985.



Table 4. Species and number of forage minnows and young-of-year fish captured by beach seining in Fort Peck Reservoir, 1985.

Species ¹	Upper Big Dry ²		Lower Big Dry ³		Lower Missouri ⁴		Mid Missouri ⁵		Upper Missouri ⁶		Total	
	No. Fish	No./Haul	No. Fish	No./Haul	No. Fish	No./Haul	No. Fish	No./Haul	No. Fish	No./Haul	No. Fish	No./Haul
WE	36	2.0	25	0.6	21	0.4	77	1.8	60	1.7	219	1.1
NP	24	1.3	5	0.1	---	---	---	---	---	---	29	0.1
SG	---	---	---	---	---	---	---	---	36	1.0	36	0.2
YP	18,943	1052.4	7,135	169.9	730	12.8	4,144	94.2	743	20.6	31,695	160.9
GE	---	---	---	---	5	<0.1	---	---	504	14.0	509	2.6
WS	---	---	13	0.3	435	7.6	465	10.6	56	1.6	969	4.9
RC	---	---	---	---	---	---	---	---	76	2.1	76	0.4
Bsp	2	0.1	1	<0.1	2	<0.1	154	3.5	204	5.7	363	1.8
LC	2	0.1	---	---	---	---	---	---	---	---	2	<0.1
C	1	<0.1	---	---	14	0.2	104	2.4	170	4.7	289	1.5
SR	---	---	---	---	---	---	---	---	110	3.1	110	0.6
FD	171	9.5	---	---	---	---	14	0.3	453	12.6	638	3.2
SMB	2	1.1	2	<0.1	5	<0.1	3	<0.1	---	---	12	<0.1
SM	---	---	---	---	6	0.1	7	0.2	403	11.2	416	2.1
CR	---	---	---	---	112	2.0	1,466	33.3	329	9.1	1,907	9.7
FC	22	1.2	---	---	---	---	11	0.3	12	0.3	45	0.2
FM	16	0.9	---	---	2	<0.1	---	---	1	<0.1	19	0.1
ES	3,088	171.6	264	6.3	303	5.3	1,787	40.6	8,667	240.8	14,109	71.6
ST	589	32.7	36	0.9	368	6.5	3,450	78.4	1	<0.1	4,444	22.6
LD	5	0.3	---	---	---	---	---	---	---	---	5	<0.1
SB	2	0.1	---	---	---	---	---	---	---	---	2	<0.1
Totals	22,903	1272.4	7,481	178.1	2,003	35.1	11,682	265.5	11,825	328.5	55,894	283.7
No. Hauls	18		42		57		44		36		197	

¹ WE - walleye	WS - white sucker	SR - shorthead redhorse sucker	FC - flathead chub
NP - northern pike	RC - river carpsucker	FD - freshwater drum	FM - fathead minnow
SG - sauger	Bsp - smallmouth/bigmouth buffalo	SMB - smallmouth bass	ES - emerald shiner
YP - yellow perch	LC - lake chub	SM - silvery/plains minnow	ST - spottail shiner
GE - goldeye	C - carp	CR - black/white crappie	LD - longnose dace
			SB - stickleback

²Upper Big Dry: Stone House, Big Dry Cr. Bay, Nelson Cr., Lone Tree, McGuire Cr.

³Lower Big Dry: Box Cr., S. & N. Fork Rock Cr., Rock Cr. Park, Box Elder Cr., Sandy Arroyo Cr., Spring Cr.

⁴Lower Missouri: Bear Cr., Duck Cr., Catfish Bay, Sturgeon Bay, Spillway Bay.

⁵Mid Missouri: Pines, Gilbert Cr., Crooked Cr., Hell Cr., Sutherland Cr.

⁶Upper Missouri: Timber Cr., Blackfoot Cr., Fourchette Cr., Devils Cr., Musselshell, Crooked Cr., Soda Cr.



COMMERCIAL FISHING

Four commercial permits were issued in 1985, but only three were utilized. Regulations for commercial fishing remained essentially the same as in the previous year.

Goldeye were the only commercially harvested fish species reported in 1985. The catch totaled 295,120 pounds (round weight), which was 81 percent of the goldeye harvest in 1984, Table 5. Other commercial species are not being sought due to low market demand, which has been the case over the past four years.

Goldeye were sampled at a commercial processing plant near Fort Peck town-site. Catches from both the upper and lower Missouri Arm were checked. Gill nets used by commercial fishermen were 300- x 14-foot floating mono-filament nets with 1 3/4-inch square mesh. Results of this sampling are shown in Table 6.

As in previous years, female goldeye dominated the commercial catch in 1985. Females were more abundant in the lower Missouri Arm than in the upper portions. The average weight of goldeye was slightly greater in the lower region than in the upper, 0.90 pounds and 0.83 pounds, respectively. Average weights were up slightly from 1984; 0.88 pounds in the lower area and 0.81 pounds in the upper.

Trends in netting efficiency for commercial harvest of goldeye were calculated by determining the number of pounds taken per square foot of gill net over the past several years, Table 7. The netting efficiency appeared to increase slightly from 1984, which may have resulted from lower water levels during 1985.

ZOOPLANKTON SAMPLING

Eight stations throughout the reservoir were sampled for zooplankton from May through September (Figure 2). Zooplankton were sampled to determine seasonal fluctuations in overall population densities and to determine the horizontal distribution of the major zooplankton groups.

The percent composition of zooplankton populations for all stations combined was nearly the same for cladocerans and copepods. Cladocerans comprised 47 percent of the total and copepods 53 percent. There appeared to be no clear trends when comparing seasonal abundance of cladocerans between sampling stations. Copepod densities peaked at most stations in late May and June as in previous years (Wiedenhaupt, 1983-84). The average density of cladocerans was fairly uniform from station to station during the sampling period, with the exception of stations 7 and 8 (Table 8). The higher averages for these stations may not reflect the true densities for this area, however, as fewer zooplankton samples were taken here than at stations 1-5. Copepod densities varied from 6.2 per liter to 11.7 per liter, with the largest concentrations in the mid and lower Missouri Arm (STA. 3-5). This trend is consistent with



Table 5. Total pounds (round weight) of commercial species harvested from Fort Peck Reservoir by commercial fishermen for years 1957 through 1985.

Year	Buffalo sp.	River Carpsucker	Carp	Carp & R. ¹ Carpsucker	Channel ² Catfish	Goldeye	Freshwater Drum	Sucker sp.	Total
1957	15,308	7,200	1,500	---	---	---	---	---	24,008
1958	176,091	---	---	25,837	100	17	107	---	202,152
1959	154,770	2,687	13,850	---	462	---	1,875	62	173,706
1960	26,435	11,500	50	---	585	---	---	---	38,570
1961	15,950	950	610	---	790	---	---	---	18,300
1962	130,842	---	---	---	22,215	---	---	---	153,057
1963	263,696	3,440	5,707	---	15,576	49	688	---	289,156
1964	145,706	3,775	1,012	---	7,492	---	1,350	---	159,335
1965	184,003	---	1,400	---	11,666	---	550	---	197,619
1966	266,142	---	---	22,935	16,879	42	2,581	---	308,579
1967	389,083	---	---	35,775	10,066	56,050	4,012	---	494,986
1968	452,230	---	---	100,774	7,749	53,318	5,445	1,625	621,141
1969	323,648	64,718	13,719	---	4,503	199,279	11,759	186	617,812
1970	437,308	49,731	8,944	---	10,619	68,384	19,287	56	594,329
1971	279,831	31,658	1,403	---	13,746	186,310	8,019	1,429	522,396
1972	474,025	40,327	10,992	---	8,060	61,830	9,228	141	604,603
1973	546,657	13,045	3,975	---	2,704	130,061	8,018	---	704,460
1974	376,850	16,719	---	---	1,011	93,825	94	---	500,638
1975	274,091	6,512	---	---	688	129,299	---	---	390,252
1976	402,543	8,456	---	---	---	91,358	---	---	502,357
1977	343,930	8,500	---	---	---	121,868	---	---	474,298
1978	243,166	6,075	---	---	---	105,919	---	---	355,160
1979	224,200	12,862	4,475	---	---	258,780	---	---	500,317
1980	178,777	8,454	5,662	---	---	356,755	509	---	550,157
1981	260,389	6,473	20,788	---	---	244,322	301	---	532,273
1982	123,100	4,357	---	---	---	208,736	---	---	336,193
1983	111,464	1,876	5,060	---	---	403,628	91	---	522,119
1984	64,113	636	---	---	---	362,313	11	---	427,073
1985	---	---	---	---	---	295,120	---	---	295,120
Total	6,884,348	309,951	99,147	185,321	134,891	3,427,263	73,925	3,499	11,118,345

¹Not differentiated by commercial fishermen when reported.

²Not allowed as commercial species after June 30, 1975.



Table 6. Average weights, lengths, and sex composition of samples taken from commercial goldeye catches in 1985 from Fort Peck Reservoir.

Area	Sex	Number	Avg. Total Length	Avg. Weight	Percent* Composition	Number
Lower	M	260	13.3	0.82	31.9	(399)
	F	<u>380</u>	<u>13.9</u>	<u>0.95</u>	<u>68.1</u>	(853)
	Total	640	13.6	0.90	100.0	(1,252)

Upper	M	131	13.0	0.80	42.7	(557)
	F	<u>269</u>	<u>13.2</u>	<u>0.85</u>	<u>57.3</u>	(747)
	Total	400	13.1	0.83	100.0	(1,304)

*Larger sample size than goldeye measured for length and weight.

Table 7. Netting efficiency of commercial fishermen at various locations on Fort Peck Reservoir from 1980 through 1985. Figures indicate pounds of goldeye taken per square foot of gill net.

Area	Year					
	1980	1981	1982	1983	1984	1985
Duck Creek	0.019	0.010	0.012	0.014	0.014	0.011
Skunk Coulee	---	0.016	---	---	---	0.006
Haxby	---	0.012	---	---	---	---
3rd Point	---	---	---	0.015	0.013	---
Pines	---	---	0.016	0.012	0.010	0.007
6th-8th Point	---	0.011	---	0.012	0.007	0.010
Be Bee	---	---	0.014	0.010	---	---
Hell Cr.	---	---	0.009	0.008	0.007	0.007
Sutherland	0.016	0.008	0.009	0.009	0.008	0.010
Snow Cr.	0.125	0.007	0.008	0.010	0.013	0.011
Wagon Coulee	0.020	0.010	0.013	0.007	0.012	0.010
Bone Trail	0.023	0.014	0.012	---	0.012	0.011
Timber Cr.	0.022	---	---	0.012	0.012	0.011
Blackfoot	0.021	---	---	---	---	---
Devils Cr.	0.033	0.021	0.011	0.011	0.012	0.014
Lost Cr.	0.016	---	---	---	---	---
Musselshell	0.125	---	---	0.019	---	---
All Areas Combined	0.042	0.012	0.012	0.012	0.011	0.013



Figure 2. Map of Fort Peck Reservoir depicting the eight sampling stations where zooplankton, water temperatures, and water transparency were sampled in 1985.

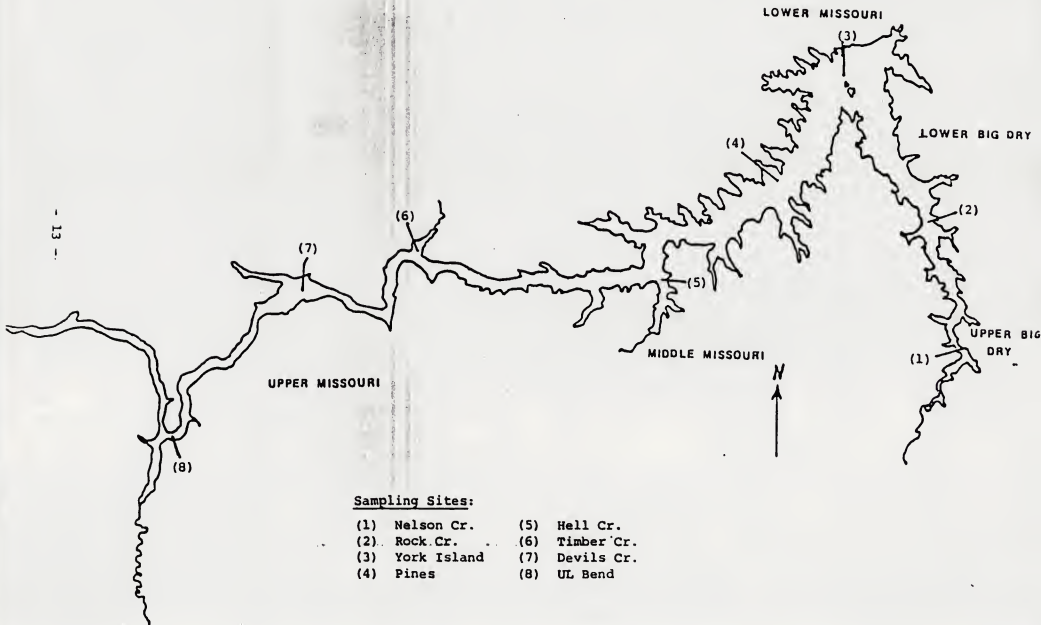




Table 8. Mean density (No./L) and range of density (in parentheses) of major zooplankton groups collected in 0- to 25-foot vertical tows during May through September, 1985 from eight stations on Fort Peck Reservoir. Monthly samples from each location were taken at approximately the same time.

	Stations ¹							
	1	2	3	4	5	6*	7*	8*
cladocerans ²	6.6 (3.9-12.2)	5.2 (2.0-9.5)	6.1 (1.2-12.2)	5.5 (1.3-12.6)	5.5 (1.9-9.8)	5.9 (4.2-7.3)	12.1 (3.3-21.7)	16.1 (0.9-49.4)
copepods ³	8.0 (4.4-11.6)	7.3 (2.6-13.2)	9.1 (2.5-23.1)	9.0 (2.0-22.0)	11.7 (8.1-15.6)	7.5 (2.8-12.1)	7.8 (2.1-15.5)	6.2 (1.5-13.2)
	14.6	12.5	15.2	14.5	17.2	13.4	19.9	22.3

¹ 1 - Nelson Creek Station
 2 - Rock Creek Station
 3 - York Island Station
 4 - Pines Station

5 - Hell Creek Station
 6 - Timber Creek Station
 7 - Devils Creek Station
 8 - UL Bend Station

² cladocerans = Daphnia sp., Diaphanosoma sp., and Leptodora sp.

³ copepods = Cyclops sp., Diaptomus sp., and Mesocyclops sp.

*May-August



the previous year, but may not provide an accurate measure of densities in the upper Missouri Arm (STA. 6-8) for reasons addressed earlier (Table 8).

The seasonal fluctuations in total density of the major crustacean zooplankton sampled at each station is shown in Figure 3. No clear seasonal trends were apparent.

PHYSICAL LIMNOLOGY

Water transparency and temperature profiles were sampled at eight stations throughout the reservoir. Samples were taken at monthly intervals from May through September (Figure 2).

Thermal stratification of the reservoir was not observed until late June (Figure 4). Weak thermoclines were apparent at depth of 45 feet at Rock Creek (STA. 2) and at 65 feet near York Island (STA. 3). A thermocline was also observed at Devil's Creek (STA. 7) at 30 feet. In late July, strong thermoclines were observed at 55 feet near Rock Creek and 45 feet in the vicinity of York Island (Figure 5). Thermoclines also appeared from 30 to 40 feet at the Pines (STA. 4), Hell Creek (STA. 5), Timber Creek (STA. 6), and Devil's Creek. In late August, strong thermoclines were again observed at Rock Creek, 40 feet; York Island, 80 feet; Hell Creek, 60 feet; Timber Creek, 55 feet; and Devil's Creek at 40 feet (Figure 5). Temperatures in the water column at the Pines during this sampling period were nearly uniform from surface to the bottom. This condition probably resulted from mixing of the water column due to extremely high winds a few days prior to sampling. By late September/early October, no thermal stratification was observed at any of the stations sampled (STA. 1-5), Figure 6.

A Secchi disc was used to monitor water transparency at all stations throughout the sampling period. As in previous years, turbidities were greatest at stations near major tributaries, such as Big Dry Creek (STA. 1) and the Musselshell/Missouri River (STA. 8), Figures 4, 5, and 6.

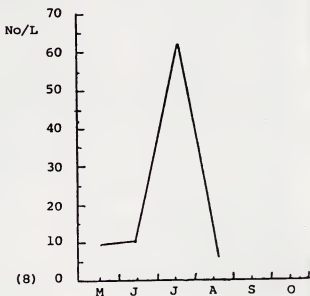
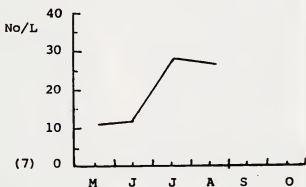
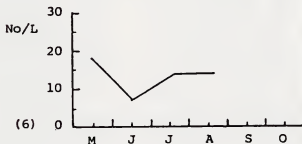
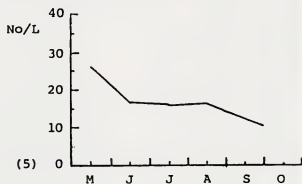
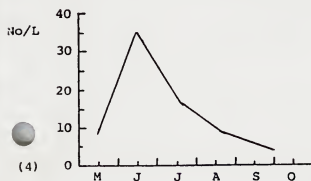
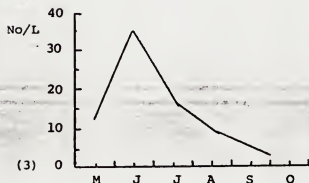
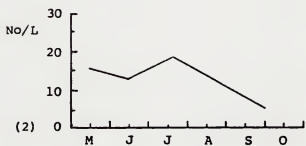
DISCUSSION

Spawning walleye continued to dominate the catch during spring trapping in the upper Big Dry. The number of walleye taken per trap-day has doubled since 1984 and is above the 8-year average of 7.0 fish per trap-day. This apparent increase in walleye abundance is attributed to an expanded stocking effort of both fry and fingerlings. Natural reproduction continues to be severely limited due to the scarcity of suitable spawning habitat and poor water level management.

The average size of trapped walleye also seems to be improving. An increase in average weight of 0.5 pounds has occurred since trapping in 1984. Walleye sampled with gill nets in this area also showed an increase in average weight from 1984 by nearly 0.25 pound. This increase in size is



Figure 3. Seasonal trends in total density of principal crustacean zooplankton (No./L) sampled at eight stations in Fort Peck Reservoir, 1985.





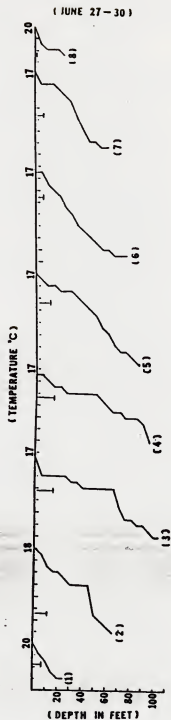
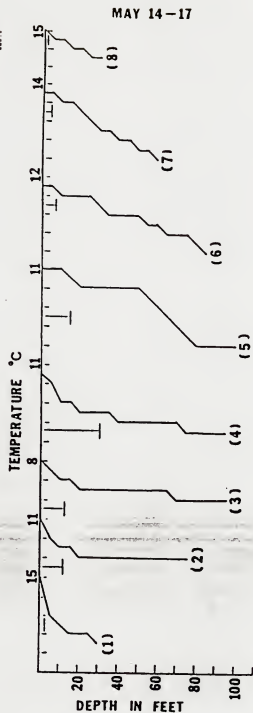


Figure 4. Water temperature profiles and Secchi disc readings taken at eight sampling stations on Fort Peck Reservoir during May and June, 1985. (Dotted lines indicate Secchi disc readings; solid lines indicate temperature profiles.)



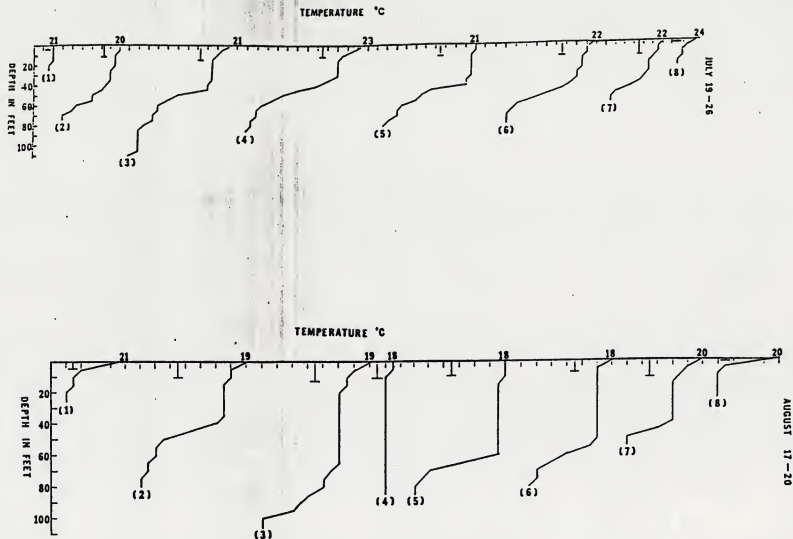


Figure 5. Water temperature profiles and Secchi disc readings taken at eight sampling stations on Fort Peck Reservoir during July and August, 1985. (Dotted lines indicate Secchi disc readings; solid lines indicate temperature profiles.)



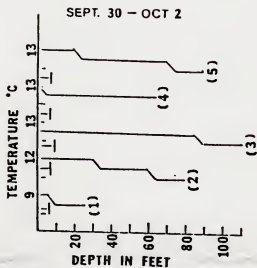


Figure 6. Water temperature profiles and Secchi disc readings taken at eight sampling stations on Fort Peck Reservoir during September and October, 1985. (Dotted lines indicate Secchi disc readings; solid lines indicate temperature profiles.)



believed to have resulted from recent introductions of spottail shiners and greater abundance of yellow perch. Numbers of spottail shiners captured by seining since 1984 have more than doubled, as did yellow perch (YOY). The number of adult yellow perch trapped in the upper Big Dry has also doubled since sampling in 1984.

The average weight of other trapped piscivores, such as sauger and northern pike, does not appear to be increasing; however, the sample size of these species is very small and may not accurately represent the condition of the entire population.

Gill netting throughout the reservoir did not indicate an increase in the total catch rate for all species combined, but did show a 78 percent increase in the number of walleye captured since 1984. The largest increase was observed in the Big Dry Arm.

Numbers of adult sauger caught by gill nets also increased over the previous year. The overall catch rate was up by 68 percent. The upper Big Dry appeared to be the only location which did not show this trend.

Numbers of northern pike and yellow perch captured throughout the reservoir by gill netting remained essentially unchanged since 1984. Goldeye numbers were also similar to the previous year, in spite of complaints by commercial fishermen to the contrary.

Fall beach seining for forage fish and young-of-year of other fish species indicated that overall numbers were nearly the same as in 1984. Goldeye YOY and juveniles appeared to have decreased by half of the number taken in the preceding year. This apparent drop in abundance of young goldeye may not be real, however, as low reservoir water levels prevented access to traditional sampling areas in the upper Missouri Arm.

Seining success was up substantially for forage minnows such as spottail and emerald shiners, while numbers of western silvery minnows and flathead chubs were down. Spottail shiner captures increased from 9.7 per haul in 1984 to 22.6 per haul in 1985. Emerald shiners increased from 47.1 per haul to 71.6 per haul.

Seining for yellow perch throughout the reservoir indicated that the numbers of YOY taken per seine haul had more than doubled since 1984. Numbers of YOY crappie had dropped by nearly two-thirds.

Numbers of YOY walleye captured by seining also doubled since 1984. This is attributed to increased stocking as described earlier. The largest increases were noted in the upper Missouri and upper Big Dry Arms.

Lower inflows and reduced water levels in Fort Peck Reservoir seemed to diminish the production of YOY for many species of fish which prefer riverine-type habitat for spawning. Numbers of YOY goldeye, river carpsucker, and sauger were significantly down from previous years. Lower lake elevations,



however, did not seem to negatively effect the production of yellow perch. This may have resulted from relatively large quantities of submerged aquatic vegetation which was observed in the Big Dry Arm and some areas in the mid-Missouri Arm. While the appearance of this vegetation was probably not early enough for spawning, it should have provided good cover which contributed to better survival of young.

The monitoring of commercial harvest of goldeye indicates a trend toward larger average sizes in the lower Missouri Arm over the past three years (Appendix, Table 2). Although netting efficiency remains essentially unchanged during this period, there is a possibility that overharvest of the population may be occurring. Continued monitoring of this trend will be necessary to determine if this theory is correct.

The potential impact of the newly introduced cisco to the commercial fishery was made apparent in the fall of 1985. Fry stocked in the spring of 1984 reached sexual maturity in November. A large number of adult cisco were observed in commercial gill nets running eggs and milt. This is the first time natural reproduction by cisco has been documented in Fort Peck Reservoir.

LITERATURE CITED

- Wiedenheft, William. 1983. Establishment of Aquatic Baselines in Large Inland Impoundments. National Marine Fisheries Service, U.S. Dept. of Commerce, NOAA.
- _____. 1984. Establishment of Aquatic Baselines in Large Inland Impoundments. National Marine Fisheries Service, U.S. Dept. of Commerce, NOAA.



APPENDIX



Table 1. Species and number of various fish captured in spring trap-netting in the upper Big Dry Arm of Fort Peck Reservoir, 1977-1985. Number of fish caught per trap-day is in parentheses.

Date	Species ¹																Total ² Fish	Trap- Days
	WE	SG	YP	NP	RC	WS	SR	SB	C	GE	CC	B	BLB	BB	RT	FD		
1985	1,202 (12.4)	13 (0.1)	487 (5.0)	69 (0.8)	360 (3.7)	141 (1.5)	262 (2.7)	47 (0.5)	141 (1.5)	74 (0.8)	61 (0.6)	10 (0.1)	17 (0.2)	3 (<0.1)	--	1 (<0.1)	2,888 (29.8)	97
1984	579 (6.0)	38 (0.4)	236 (2.5)	21 (0.2)	29 (0.3)	31 (0.3)	78 (0.8)	10 (0.1)	17 (0.2)	5 (<0.1)	15 (0.2)	8 (0.1)	--	--	1 (<0.1)	--	1,069 (11.1)	96
1983	725 (6.8)	48 (0.5)	42 (0.4)	87 (0.8)	370 (3.5)	65 (0.6)	129 (1.2)	66 (0.6)	97 (0.9)	26 (0.3)	28 (0.3)	13 (0.1)	1 (<0.1)	1 (<0.1)	2 (<0.1)	3 (<0.1)	1,703 (16.1)	106
1982	655 (7.4)	18 (0.2)	58 (0.7)	218 (2.4)	355 (4.0)	195 (2.2)	90 (1.0)	70 (0.8)	191 (2.1)	151 (1.7)	16 (0.2)	11 (2.2)	1 (<0.1)	4 (<0.1)	2 (<0.1)	--	2,037 (22.9)	89
1981	371 (2.7)	73 (0.5)	76 (0.5)	98 (0.7)	121 (0.9)	215 (1.5)	99 (0.7)	48 (0.3)	95 (0.7)	114 (0.8)	16 (0.1)	44 (0.3)	--	--	--	--	1,374 (9.8)	140
1980	535 (5.5)	57 (0.6)	63 (0.6)	301 (3.1)	612 (6.6)	177 (1.8)	142 (1.5)	112 (1.2)	98 (1.0)	12 (0.1)	--	70 (0.7)	--	--	--	--	2,222 (22.9)	97
1979	325 (4.3)	39 (0.5)	15 (0.2)	283 (3.8)	139 (1.8)	13 (0.2)	8 (0.1)	119 (1.6)	161 (2.1)	121 (1.6)	--	30 (0.4)	--	--	--	--	1,261 (16.8)	75
1978	1,839 (22.7)	81 (1.0)	26 (0.3)	400 (4.9)	246 (3.0)	193 (2.4)	133 (1.6)	180 (2.2)	71 (0.9)	265 (3.3)	3 (<0.1)	47 (0.6)	28 (0.3)	7 (0.1)	1 (<0.1)	--	3,522 (43.2)	81
1977	1,700 (5.8)	43 (0.2)	145 (0.5)	415 (1.4)	654 (2.2)	139 (0.5)	185 (0.6)	67 (0.2)	223 (0.8)	--	36 (0.1)	46 (0.2)	377 (1.3)	--	--	22 (0.1)	4,070 (13.8)	295

¹WE - walleye

SG - sauger

YP - yellow perch

NP - northern pike

RC - river carpsucker

WS - white sucker

SR - shorthead redhorse sucker

SB - smallmouth buffalo

C - carp

GE - goldeye

CC - channel catfish

B - burbot

BLB - black bullhead

BB - bigmouth buffalo

RT - rainbow trout

FD - freshwater drum

²May include more species than those listed; less than 0.1 fish caught per trap-day.



Table 2. Summary of samples taken from commercial goldeye catches from Fort Peck Reservoir, 1977-1985.

Year	Number		Avg. T.L.		Avg. Wt.		Percent Composition		
	F	M	F	M	F	M	F	M	
Lower ¹	1977	198	33	13.6	13.0	0.88	0.77	86.0	14.0
	1978	209	11	13.2	12.4	0.82	0.72	95.0	5.0
	1979	419	43	13.5	12.6	0.85	0.73	90.7	9.3
	1980	1,233	252	13.6	13.1	0.87	0.77	83.0	17.0
	1981	708	118	13.7	13.2	0.89	0.77	87.5	12.5
	1982	319	81	13.7	13.0	0.88	0.76	80.5 ³	19.5 ³
	1983	360	241	13.4	13.1	0.84	0.74	66.2 ³	33.8 ³
	1984	551	197	14.0	13.3	0.91	0.80	69.3 ³	30.7 ³
	1985	380	260	13.9	13.3	0.95	0.82	68.1 ³	31.9 ³
Upper ²	1977	---	---	---	---	---	---	---	
	1978	---	---	---	---	---	---	---	
	1979	787	65	13.2	12.7	0.83	0.72	92.4 ³	7.6
	1980	179	18	13.2	13.0	0.84	0.79	93.6 ³	6.4 ³
	1981	912	158	13.2	12.9	0.80	0.72	85.6 ³	14.4 ³
	1982	687	195	13.2	12.7	0.77	0.69	78.3 ³	21.7 ³
	1983	764	233	12.9	12.7	0.79	0.72	80.9 ³	19.1 ³
	1984	181	194	13.2	12.9	0.85	0.77	61.2 ³	38.8 ³
	1985	269	131	13.2	13.0	0.85	0.80	57.3 ³	42.7 ³

¹The lower 30 miles of the Missouri Arm.

²The upper 30 to 70 miles of the Missouri Arm, above Fort Peck Dam.

³Figures include additional numbers of goldeye which were selected at random from commercial catches.



APPENDIX

Table 2. Summary of samples taken from commercial goldeye catches from Fort Peck Reservoir, 1977-1984.

Year	Number		Avg. T.L.		Avg. Wt.		Percent Composition		
	F	M	F	M	F.	M	F	M	
Lower ¹	'77	198	33	13.6	13.0	0.88	0.77	86.0	14.0
	'78	209	11	13.2	12.4	0.82	0.72	95.0	5.0
	'79	419	43	13.5	12.6	0.85	0.73	90.7	9.3
	'80	1,233	252	13.6	13.1	0.87	0.77	83.0	17.0
	'81	708	118	13.7	13.2	0.89	0.77	87.5	12.5
	'82	319	81	13.7	13.0	0.88	0.76	80.5 ³	19.5 ³
	'83	360	241	13.4	13.1	0.84	0.74	66.2 ³	33.8 ³
	'84	551	197	14.0	13.3	0.91	0.80	69.3 ³	30.7 ³
Upper ²	'77	---	---	---	---	---	---	---	
	'78	---	---	---	---	---	---	---	
	'79	787	65	13.2	12.7	0.83	0.72	92.4 ³	7.6
	'80	179	18	13.2	13.0	0.84	0.79	93.6 ³	6.4 ³
	'81	912	158	13.2	12.9	0.80	0.72	85.6 ³	14.4 ³
	'82	687	195	13.2	12.7	0.77	0.69	78.3 ³	21.7 ³
	'83	764	233	12.9	12.7	0.79	0.72	80.9 ³	19.1 ³
	'84	181	194	13.2	12.9	0.85	0.77	61.2 ³	38.8 ³

¹The lower 30 miles of the Missouri Arm.

²The upper 30 to 70 miles of the Missouri Arm, above Fort Peck Dam.

³Figures include additional numbers of goldeye which were selected at random from commercial catches.

